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(54) **Systems for positioning therapy delivery elements within a spinal cord or a brain**

(57) The present invention addresses the problems associated with lead migration, patient movement or position, histological changes, neural plasticity or disease progression. The present invention discloses techniques for implanting a lead having therapy delivery elements, such as electrodes or drug delivery ports, within a vertebral or cranial bone so as to maintain these elements in a fixed position relative to a desired treatment site. The therapy delivery elements may thereafter be adjusted in situ with a position control mechanism and/or a position controller to improve the desired treatment therapy. The present invention also discloses techniques for non-invasively positioning and re-positioning therapy delivery elements after implant to provide electrical stimulation and/or drug infusion to a precise target. A position control mechanism and/or a position controller are provided for adjusting in situ the position of the therapy delivery elements relative to the targeted tissue of interest. The therapy delivery elements may be positioned laterally in any direction relative to the targeted treatment site or toward or away from the targeted treatment site. A control system may be provided for open or closed-loop feedback control of the position of the therapy delivery elements as well as other aspects of the treatment therapy.

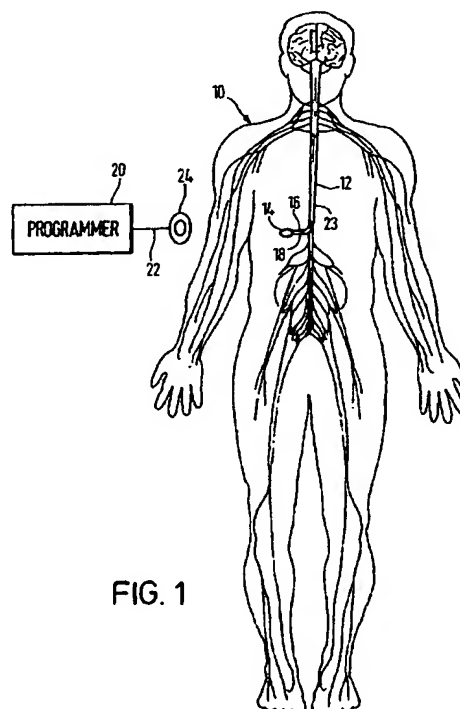


FIG. 1



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EUROPEAN SEARCH REPORT

Application Number
EP 00 10 7043

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 0 104 287 A (SCARBERRY EUGENE NELSON) 4 April 1984 (1984-04-04) * figures 1,4 *	1	A61N1/05 A61N1/34
Y	---	6	
X	US 4 285 347 A (HESS STANLEY R) 25 August 1981 (1981-08-25) * figures 1-4 *	1	
Y	---	6	
X	US 4 519 403 A (DICKHUDT EUGENE A) 28 May 1985 (1985-05-28) * figures 1,2 *	1	
Y	---	6	
X,P	WO 99 55411 A (MEDTRONIC INC) 4 November 1999 (1999-11-04) * abstract *	1-5,7	
Y	---	6	
Y	US 5 683 422 A (RISE MARK T) 4 November 1997 (1997-11-04) * abstract *	6	

The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			A61N
Place of search MUNICH		Date of completion of the search 22 January 2003	Examiner Rodríguez Cossío, J
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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Application Number

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☒ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



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**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
EP 00 10 7043

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-18
position control mechanism
2. Claims: 19-26,18
extendable member depending from a central portion
3. Claims: 27,28
bone implantable housing member
4. Claims: 29-32,8-11
mechanism for expanding the middle portion of a paddle lead
5. Claims: 33-35,12-14
balloon-like mechanism
6. Claims: 36-38,15
movable means on ventral side
7. Claims: 39,17
gear means
8. Claim : 16
wire means

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 10 7043

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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22-01-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0104287 A	04-04-1984	US 4351330 A EP 0104287 A1	28-09-1982 04-04-1984
US 4285347 A	25-08-1981	EP 0023410 A1	04-02-1981
US 4519403 A	28-05-1985	NONE	
WO 9955411 A	04-11-1999	US 6161047 A EP 1075303 A2 WO 9955411 A2 US 2002151948 A1 US 6319241 B1 US 6292702 B1 US 2001023367 A1 US 2001053885 A1	12-12-2000 14-02-2001 04-11-1999 17-10-2002 20-11-2001 18-09-2001 20-09-2001 20-12-2001
US 5683422 A	04-11-1997	AU 2595397 A EP 0895483 A1 WO 9739795 A1 US 5792186 A	12-11-1997 10-02-1999 30-10-1997 11-08-1998

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82